STAFF REPORT

DATE: December 10, 2013

TO: City Council

FROM: Robert A. Clarke, Public Works Director
Michael Mitchell, Principal Civil Engineer

SUBJECT: Transportation Infrastructure Rehabilitation Project, CIP 8250

Recommendation

Receive a status update on progress to date for the Pavement Management Program and confirm the scope and schedule for City staff to continue with the program development.

Fiscal Impact

There are no direct fiscal impacts as a result of this item. However, future decisions made as a result of this item could have significant fiscal impacts as outlined in the Report.

Council Goal(s)

Preparation of this Report addresses the following City Council goals:

- (FS-3) Review pavement management index criteria for selection of projects.
- (I-3) Prioritize maintenance of sidewalks, bicycle paths and streets.
- (I-2) Examine projects and services in order to update and prioritize unmet needs. Identify funding mechanisms.

Background

This is the fifth time this calendar year that Staff have brought the Pavement Management program to City Council.

- In February 2013, Staff and Nichols Consulting Engineers (Nichols) presented their 2012, City-wide pavement survey and general pavement management strategies.
- In April 2013, existing and alternative funding sources were discussed and Council adopted general guidelines in selecting streets for the Pavement Management program.
- In May 2013, Staff presented several maintenance strategies for streets and bicycle paths. Council approved, in concept, for a multi-year funding and budgeting strategy that would provide $25 million in the first two years with set PCI (Pavement Condition Index) goals for the different classes of streets. Council also directed staff to obtain the services of a pavement design consultant and an outreach consultant for this maintenance effort and to return later in 2013 with an update.
- In October 2013, City Council approved the selection of Nichols as the design consultant for the first year of the Pavement Management program.

This update is to inform the City Council of the work that has been done to date and to reiterate that the adopted strategy of front-loading funding for the Pavement Management Program ($25 million in the first two years) will save money in the long run and help minimize the average condition of the City's streets and bicycle paths from further deterioration.

Funding

The staff report from the May 21, 2013, meeting outlined several maintenance scenarios to see how funding and maintenance options affected future street and bike path condition. Staff recommended the B-Mod Scenario for streets and the Maintain Backlog scenario for bike paths. This combination called for the following funding: $15 million the first year, $10 million the second year, and a lesser amount of funding for years three through twenty, which would maintain average PCI goals for the different street classes and maintain the backlog for bike paths. The average PCI goals for streets are 68 for arterials, 65 for collectors and selected priority local streets, and 60 for local streets. Priority local streets were defined as those serving key areas such as commercial zones, parks, schools, and public facilities and those along bus routes or which included bike lanes. The B-Mod Scenario required about $7.6 million annually in years three through twenty for street paving alone to maintain the street PCI goals. Adding in bike paths and concrete flatwork, this would equate to funding the pavement maintenance program with approximately $10 million annually in years 3 through 20. It is unlikely that the City could afford this much annually so a lower, more realistic amount is needed.

Unless otherwise noted, the funding numbers mentioned above are gross numbers in that the total amount of funding noted would not be available to fund paving. The gross numbers include funding for concrete curb, gutter and sidewalk repair and ADA compatible ramps that are associated with street maintenance. In addition, the gross numbers include soft costs such as design, construction management, materials testing, etc. A percentage of the total funding is reserved for bicycle path pavement maintenance. This was discussed in more detail at the May 2013 Council meeting and the table from that staff report, showing the breakdown is included as **Attachment 1**. For every **$1 million** that is funded to the program, approximately **$720,000** will go to actual street pavement and approximately **$110,000** will go to bicycle path maintenance. For the purposes of this staff report, we will specify gross numbers for the funding amounts.

Streets and Bicycle Paths for Years 1 and 2

City Staff directed Nichols to select streets and bicycle paths for a first-year project using the Council-approved guidelines from the April 2013 meeting and using $15 million as the funding amount. Nichols used the data from their October 2012 survey (presented to Council in February 2013) and the StreetSaver pavement management software to generate a list of streets based on a decision tree of treatment technologies for different ranges of pavement conditions and for different classes of streets (arterials, collectors and priority locals, and locals). They did the same thing for bicycle paths.

Nichols then edited the list of streets and the treatment technologies that StreetSaver generated using two methods. The first method was to review the list graphically (office review). StreetSaver generates lists without considering real world construction and constraints and it's

the Engineer's responsibility to edit the list for constructability. For example, StreetSaver could suggest an overlay of Street X from block 1 to block 2, then skip block 3, overlay block 4, and so on, based on surveyed PCI. The Engineer would verify the blocks to determine if the overlay should be for all four blocks as it may not be reasonable or cost effective to skip block 3.

The second method for reviewing and editing the StreetSaver list is to field verify the streets and paths. Nichols staff field verified all of the streets that StreetSaver generated for Year 1 (bike paths will be field-verified at a later date). This resulted in further edits to the street and path list. For example, while Streetsaver may have recommended a seal coat on a street, field verification may have determined that the street was a bus route and that the current condition of the street warranted an overlay.

In addition, City Staff directed Nichols to select a second year project using $10 million as the funding amount. While Nichols edited the list in their office review, the second year list has not yet been field verified.

The resulting map, showing the targeted streets for Years 1 and 2 are shown in **Attachment 2-A**. **Attachment 2-B** shows the same information for bicycle paths. As stated above, the bike paths for Years 1 and 2 and the streets for Year 2 have not been field verified.

Nichols also generated the data for the six scenarios that are shown below and will be discussed further at the Council Meeting.

Ryan Shafer, the Project Manager for Nichols, and a Division Manager for the company, will be presenting their findings at the Council Meeting.

<u>Dr. John Harvey</u>
Dr. John Harvey, Professor at UC Davis in Civil & Environmental Engineering, was hired by the City to provide technical advice for the project. Dr. Harvey is a Principal Investigator for the UC Pavement Research Center.

Dr. Harvey performed his own field verification of the first year of streets compiled by Nichols, looking at the type of defects present (e.g., load bearing failures vs. environmental failures) and suggesting treatment technologies. His comments have resulted in further edits to the street list for the first year. This is still an on-going effort.

Dr. Harvey will also have input into the design of the asphalt specification, including construction methods for which he is particularly accomplished. He will also investigate alternative treatments for bike paths.

Dr. Harvey will also give a short presentation at the Council Meeting.

Funding Scenarios for 20 years

This section revisits some of the funding scenarios that were presented at the May 2013 meeting showing the positive impact that high funding in Years 1 and 2 will have on the City's pavement that will save money in the long run (20 years out).

StreetSaver was run with the following funding scenarios, using consistent criteria for the decision trees, and generating average PCIs for Year 20. (Note again that all funding numbers are gross numbers as explained previously herein.)

1. Do Nothing – No funding is applied for street / path maintenance;
2. $2 million annual funding - $2 million is applied, escalated at 2% each year for 20 years;
3. $4 million annual funding - $4 million is applied, escalated at 2% each year for 20 years;
4. $25 million in Years 1 and 2 with no further funding in Years 3 through 20;
5. $25 million in Years 1 and 2 with $2 million annual funding for Years 3 through 20, escalated at 2% each year for 20 years;
6. Funding required to raise the average PCI's for the different classes of streets to their targets within the first 5 years, then maintain target PCI averages to Year 20 (targeted average PCIs are 68 for arterials, 65 for collectors and priority locals, 60 for locals).

Attachment 3 shows the resultant average PCI for streets and bike paths, total funding over 20 years, and the unfunded backlog in Year 20 for each funding scenario listed above.

Attachment 3 shows that Scenario 2, spending $2 million each year for 20 years (escalated at 2% for a total of $49 million) results in an average PCI of 31 for streets and 42 for bike paths and an unfunded backlog of $400 million. Scenario 3, spending $4 million each year for 20 years results in slightly better PCIs in Year 20 and the unfunded backlog reduces to $289 million. Scenario 4, spending $25 million over the first two years ($25 million total), results in an average PCI of 27 for streets and 30 for bike paths and an unfunded backlog of $427 million.

Based on this, it is apparent that spending roughly half of what could be spent over 20 years in the next 2 years would have almost as great an impact on the long-term condition of the streets. (It should be noted that the numbers above differ from those presented in the May 2013 presentation and staff report as the current models assume the streets have aged and deteriorated a year.)

However, neither of these funding scenarios results in acceptable street and path condition. Therefore, staff recommends performing the $25 million in repairs the first two years and maximizing annual funding for Years 3 through 20 as much as possible, thereby maximizing the condition of the streets and paths. Scenario 5 shows an annual budget of $2 million after the $25 million up front. Increasing this annual budget in Years 3 through 20 will greatly improve the condition averages but it must be balanced with available funds.

In the last scenario (Scenario 6), StreetSaver sets the average PCI goals to those contained in the April 2013 guidelines (68 for arterials, 65 for collectors and priority locals, and 60 for locals) and

maintains the current backlog for bike paths. Streetsaver is programmed to increase the average PCI of each class of street to its goal within the first 5 years and then maintain the PCI goal. It then estimates the funding required to meet these goals. While this scenario is desirable, staff feels the funding requirements are not realistic at this time for the City. See Attachment 3.

The price of oil – a key component in asphaltic concrete (AC) – is highly volatile and historically has inflated more than the 2% per year that we have anticipated funding would escalate. Over the last several years, oil has inflated an average of 25% per year while labor prices have escalated an average of 4% per year. The City and Nichols agreed to use a weighted average of the asphalt and labor escalation rates, yielding an escalation rate of 8% per year (since most of the cost is weighted towards labor). Since the escalation rate exceeds the rate at which funding is expected to increase, less paving would be accomplished in later years. This reinforces the recommendation to fund the program with $25 million in the earliest years.

Another effect of the rising cost of oil and hence asphalt, is that alternative pavement designs such as concrete instead of asphalt surfacing may be considered.

Conclusion

The purpose of this staff report was to provide an update of progress to the City Council on the Pavement Management Program and to show that the progress is consistent with past meetings and Council direction for funding the Pavement Management Program with $25 million in Years 1 and 2.

Staff also recommends that annual funding for Years 3 through 20 be as high as can be tolerated to maximize resulting PCIs, to minimize the unfunded backlog and to mitigate the inflation of the price of oil.

Please note that Staff has issued a Request for Proposals for the Public Outreach Consultant and expect to come to Council with a selected consultant in early 2014.

Attachments

1. Funding Breakdown Estimate (from May 21, 2013, City Council meeting)
2. Maps showing targeted streets and bicycle paths to be treated in Years 1 and 2.
3. Summary of Funding Scenarios (streets and bicycle paths)

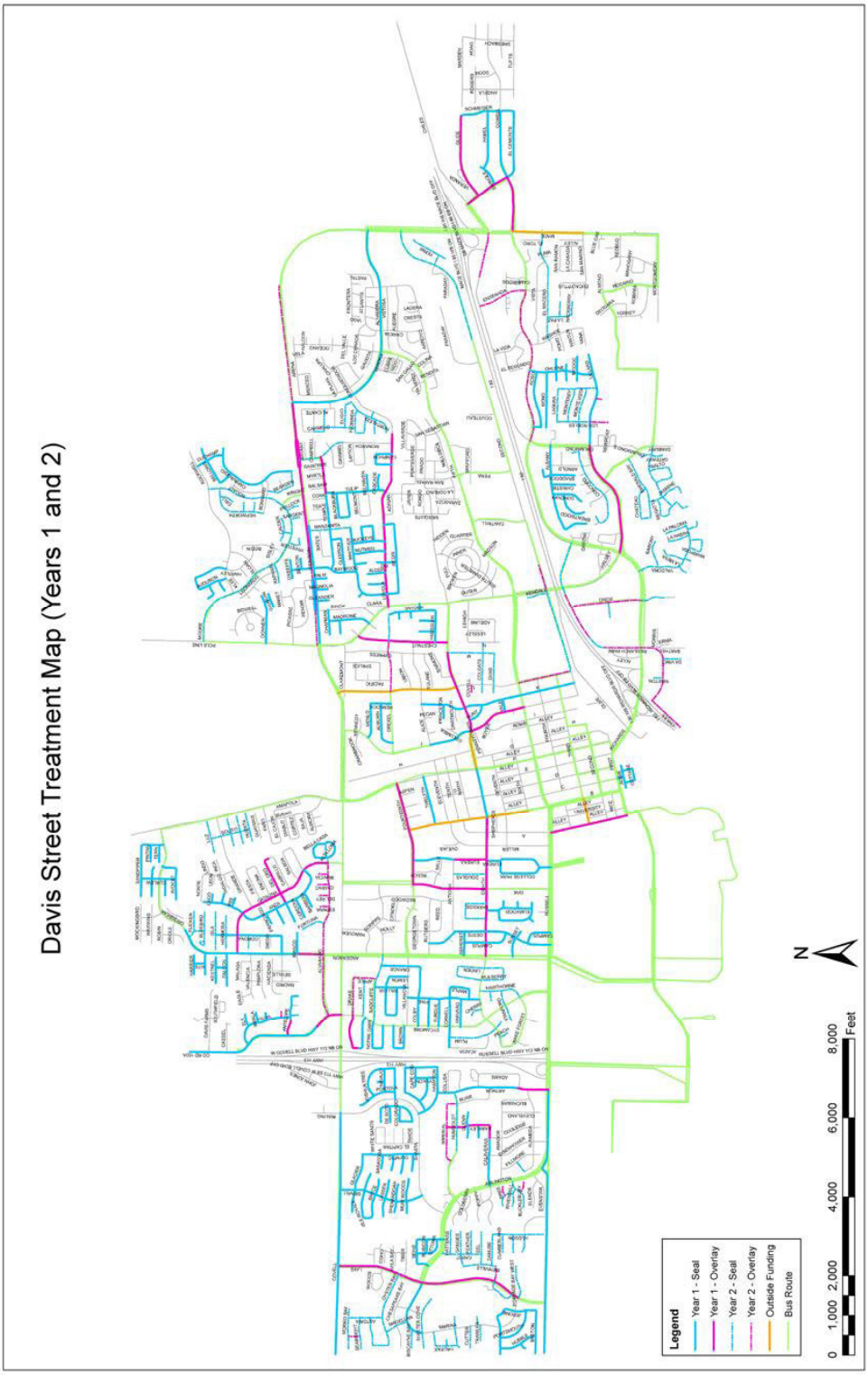
ATTACHMENT 1

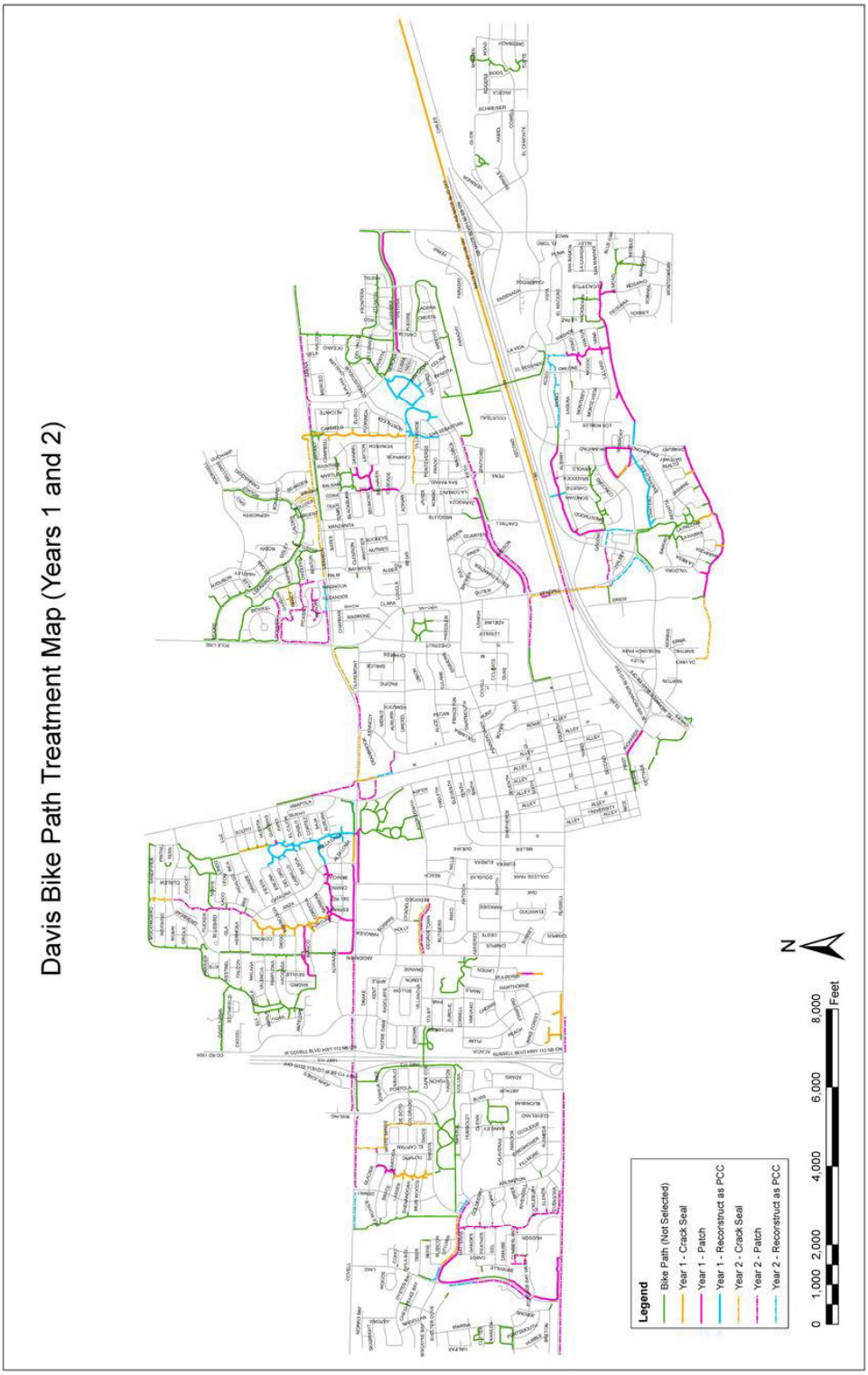
Funding Breakdown Estimate[1]

Street Paving	$9,800,000	$6,600,000	$2,740,000	$2,100,000	$1,441,000	$717,000
Bike Path Paving	$1,470,000	$990,000	$415,000	$315,000	$216,000	$107,500
Curb, Gutter, SW (5% of street paving)	$362,000	$205,000	$50,000	$13,000	$0	$0
Ramps* (10% of street paving)	$850,000	$530,000	$117,000	$60,000	$0	$0
Contingency (10% of construction cost)	$1,250,000	$830,000	$335,000	$250,000	$165,000	$82,400
Planning / Study	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Engineering & Design[2] (5% of construction cost)	$625,000	$414,000	$165,000	$125,000	$83,250	$41,200
Municipal Arts[3]	$8,000	$7,000	$3,000	$2,000	$1,500	$700
Construction Admin & Inspection (5% of construction cost)	$625,000	$414,000	$165,000	$125,000	$83,250	$41,200
TOTAL FUNDING	**$15,000,000**	**$10,000,000**	**$4,000,000[4]**	**$3,000,000**	**$2,000,000**	**$1,000,000**

1. Numbers are estimates only and have been rounded for example purposes
2. Assumes City would require outside consultant to perform
3. Municipal Arts component not required for maintenance portion of projects
4. This column was added subsequent to the May 2013 staff report

ATTACHMENT 2




Davis Bike Path Treatment Map (Years 1 and 2)
Legend
Bike Path (Not Selected)
Year 1 - Crack Seal
Year 1 - Patch
Year 1 - Reconstruct as PCC
Year 2 - Crack Seal
Year 2 - Patch
Year 2 - Reconstruct as PCC
0 1,000 2,000 4,000 6,000 8,000
Feet
N

ATTACHMENT 3

Summary of Funding Scenarios

Scenario	PCI in Year 20[1]					Total Funding	Backlog ($ millions)
	Streets - Average	Arterial Streets	Collector Streets[2]	Local Streets	Bike Paths		
1. Do Nothing	16	12	7	22	19	$0	$ 617
2. $2M esc at 2%	31	42	14	33	42	$ 49,000,000	$ 400
3. $4M esc at 2%	43	20	26	31	51	$ 97,000,000	$ 289
4. $25M only	27	42	29	39	30	$ 25,000,000	$ 427
5. $25M + $2M esc at 2%	37	55	33	41	49	$ 68,000,000	$ 278
6. PCI Goals / Maintain Path Backlog	63	68	65	60	74	$ 220,000,000	$ 132

[1] Current (2014) PCIs are as follows:

- Arterials: 60
- Collectors and priority locals 55
- Locals 61
- Average for streets 59
- Bike Paths 55

[2] Also includes “priority local” streets